PROVIDING SOLUTIONS FOR SAFE, EFFICIENT DISPOSITION OF DOE SPENT NUCLEAR FUEL

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http://nsnfp.inel.gov

Idaho Three Mile Island Project Reaches Halfway Mark

The Three Mile Island (TMI) Unit 2 Spent Fuel Dry Storage Project at the Idaho National Engineering and Environmental Laboratory has reached the halfway point.

On January 19, half of the 344 canisters holding spent nuclear fuel and core debris from the damaged reactor core of TMI Unit 2 had been removed from water storage at Test Area North (TAN), dried, and made ready for shipping to the Independent Spent Fuel Storage Installation at the Idaho Nuclear Technology and Engineering Center (INTEC).

The TMI fuel is some of the most damaged in the country. The fuel and core debris moving and drying process is complicated and performed remotely.

On February 2, the 15th of 29 dry shielded container shipments was received at INTEC and placed into a horizontal storage module, marking the halfway point for the shipments from TAN to INTEC.

The team has developed a more efficient fuel drying processes, reducing drying times from 44 hours to approximately 18 hours while developing new process insights.

The project team expects to complete the project and meet the June 1 deadline established in the 1995 Idaho Settlement Agreement for placing TMI-2 fuel canisters into dry storage.♣

More about the TMI-2 Project halfway milestone at website http://nsnfp.inel.gov

STRATEGY (Continued from page 1)

Yucca Mountain Project personnel have made significant progress on these issues.

In early February, the white paper "Information Process Flow for DOE SNF" was sent to DOE YMP/RW for review. This paper establishes the definitions and logic to identify and manage DOE SNF information necessary to support repository design, establish the licensing basis, and develop a certification approach. Further, the paper describes the information types necessary to support RW and provides a method to categorize this information. The method provides differentiation between data and technical information and supports identifying that information important to safety and waste isolation.

During a breakout session, EM and RW participants also discussed the issue of financing the SNF transportation system. This transport system will include a fleet of eight casks designed to transport both bare and canisterized DOE-owned spent nuclear fuels from consolidation sites to a repository. Seven alternatives were discussed. Most described possible funding collaborations between EM and RW, plus commercial venture funding. The general consensus was for single-source financing.

As a follow-up to the strategy meeting, Phil Wheatley, NSNFP Support Office Manager, and Tom Hill, Packaging and Transportation Technical Lead, presented SNF transportation issues to DOE EM-20 on December 1, 2000.

A status of the release rate test program was also presented. This is an NSNFP-funded program to evaluate SNF degradation and the subsequent radionuclide release after disposal at the national SNF repository.

Results of these tests feed into the performance assessment and provide verification that the assumptions used to predict doses over time are valid. Laboratory experiments are currently underway with uranium metal fuel, aluminum based fuel, and mixed oxide fuel (MOX). Additional tests are planned with graphite fuel.

Four test methods are being used to better understand the degradation and release processes of these four fuel types. Each was discussed in detail. For a more detailed description of the test methods, please visit our website at http://nsnfp.inel.gov.♣

The next NSNFP Semi-Annual Strategy Meeting will be held June 26-27, 2001, in Idaho Falls, Idaho, at University Place. More information will be posted on the NSNFP website when available.

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NSNFP
National Spent Nuclear Fuel Program

PROVIDING SOLUTIONS FOR SAFE, EFFICIENT DISPOSITION OF DOE SPENT NUCLEAR FUEL

National Spent Nuclear Fuel Program News

NSNFP Strategy Meeting Highlights

The National Spent Nuclear Fuel Program held its semiannual strategy meeting November 6-8, 2000, in Las Vegas, Nevada. Three topics featured during the meeting were repository licensing and certification, spent fuel transport, and the release rate test program.

The licensing and certification presentation emphasized the need for a risk-informed, performance-based strategy that focuses on those items important to safety and waste isolation. The event tree analysis developed by NSNFP staff was presented showing that the DOE spent fuel parameters do not appear to be important for pre– or post-closure.

The DOE-RW presentation described the information flow, the distinction between data and technical information, and their roles in design, licensing, and certification. RW presented a draft flow chart describing RW's concept of the applicability of DOE SNF information.

Based on these discussions, NSNFP and RW agreed on a licensing strategy based on the differentiation between data and technical information. They agreed to revise the current draft strategy paper to incorporate this position.

Since the strategy meeting, NSNFP and

(See STRATEGY, page 4)

Paul Harrington, DOE-YMSCO (left) and John Clouet, TRW (right) listen to Denis Koutsandreas' DOE-HQ presentation describing HLW/NSNFP synergies.

Neutron-Capturing Metal Alloy Research Improves Safe Nuclear Fuel Storage and Disposal

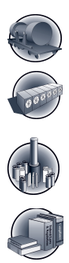
Metal alloys developed through a U.S. Department of Energy metallurgical research collaboration will offer unique solutions to crucial long-term DOE spent nuclear fuel disposal problems.

Two DOE labs and a leading university materials science department are collaborating to find an affordable and practical solution to safely store spent nuclear fuel over long periods and dispose it in a geologic repository.

Working with scientists from the Idaho National Engineering and Environmental

(See ALLOY, page 3)

Inside this issue:



Providing :

- *Solutions for safe, efficient packaging and transportation*
- *Solutions for safe interim and long-term storage*
- *Solutions for accurate characterization*
- *Compliance with safety and regulatory requirements*

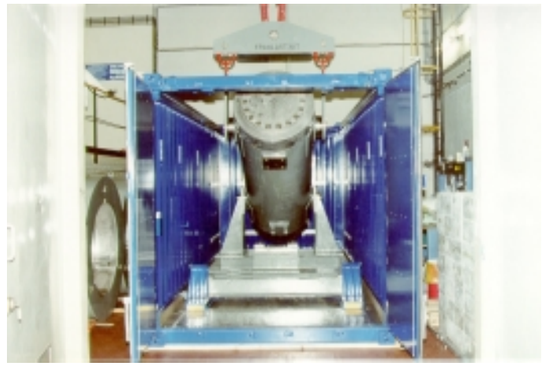
Savannah River's L-Basin Now Receiving TN-7/2 Casks

Westinghouse Savannah River Company (WSRC) developed and implemented an approach for unloading the TN-7/2 cask in the Savannah River Site (SRS) L-Area basin. The TN-7/2 casks are an important part of the ongoing foreign research reactor spent nuclear fuel receipt program.

SRS, research reactors, and shippers will benefit with the completion of this effort. For research reactors and shippers, this new approach will allow SRS to continue receipt of the TN-7/2 cask and reduce the risk for contamination of the cask exterior because L-basin has lower contamination levels than the Receiving Basin for Offsite Fuels (RBOF). Benefits to SRS include the reduction in personnel exposure by eliminating double handling of spent nuclear fuel, and it supports the RBOF deinventory efforts.

The TN-7/2 cask has historically been received into SRS's RBOF and rebundled for onsite storage. Even after the L-basin was designated as the primary SRS wet storage basin, the TN-7/2 was unloaded at RBOF due to L-basin's physical limitations. The fuel was then rebundled and transferred to L-basin, which was counterproductive to the RBOF deinventory effort. The first TN-7/2 cask was unloaded in L-basin in November 2000. In January, the empty casks were received at the Australian Nuclear Science and Technology Organization (ANSTO). HP surveys confirmed no appreciable increase in transferable contamination levels, and they were well within International Atomic Energy Agency and U.S. Department of Transportation limits.

Both the L-Area Disassembly Basin and RBOF play a crucial role in the DOE spent nuclear fuel mission. This modification provides a safe, cost-effective improvement to the continuing receipt and storage of spent nuclear fuel shipments at SRS.♣



TN-7/2 Cask being loaded into an ISO container

NSNFP 2001 MEETING SHEDULE

DATE	MEETING TITLE	LOCATION	CONTACT
April 1-4	Research Reactor Fuel Management Conference	Aachen, Germany	Jay Thomas 803-557-6402
April 22-26	American Institute of Chemical Engineers Spring Meeting (Six sessions relevant to SNF programs)	Houston, TX	Robert Wham, Oak Ridge, 865-576-7783
April 29-May 3	2001 International High-Level Radioactive Waste Management Conference	Las Vegas, NV	American Nuclear Society
June 17-21	American Nuclear Society Annual Meeting (One session on DOE SNF)	Milwaukee, WI	American Nuclear Society
June 26-27	National Spent Nuclear Fuel Program Semi-Annual Strategy Meeting	Idaho Falls, ID	Philip Wheatley, pdw@inel.gov
July 15-19	Institute of Nuclear Materials Management Annual Meeting	Indian Wells, CA	James Linhart 702-295-0366
September	Training, Research, and Test Reactors Conference	Tahoe, CA	Jay Thomas 803-557-6402
September 3-7	Institute of Nuclear Materials Management PATRAM* Symposium	Chicago, IL	www/patram.org
October	Reduced Enrichment for Research and Test Reactors Conference	Bali, Indonesia	Jay Thomas 803-557-6402
Nov. 11-15	American Nuclear Society Winter Meeting	Reno, NV	American Nuclear Society

ALLOY (Continued from page 1)

Laboratory (INEEL), Lehigh University, and Sandia National Laboratories, the National Spent Nuclear Fuel Program is developing the gadolinium alloy to fabricate the internal baskets of the standardized DOE spent nuclear fuel canister.

Safe long-term storage and disposal of DOE-managed spent nuclear fuel requires a corrosion-resistant, long-lasting structural assembly that absorbs neutrons emitted by the fuel and retains physical support and separation around the various fuel contents.

Principal investigators — the INEEL's Ronald Mizia, Lehigh University's John DuPont (winner of the Year 2000 Presidential Early Career Award for Scientists and Engineers), and Sandia's Charles Robino — say gadolinium can be alloyed with nickel, chromium, and molybdenum to create the corrosion-resistant, long-lasting, reasonably priced, weldable alloy. The process uses conventional ingot metallurgical techniques to refine and process the alloy.

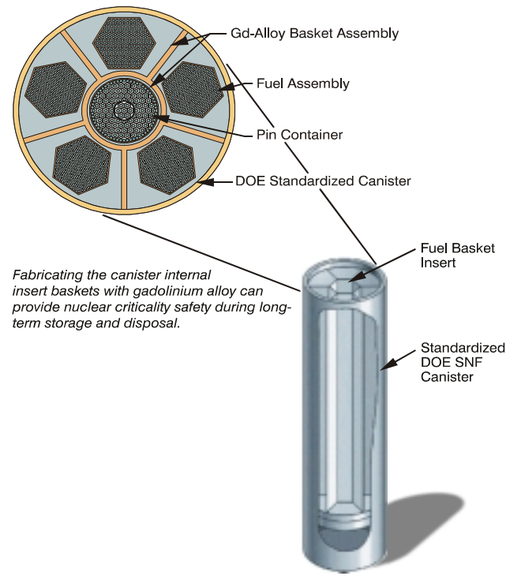
The scientists say the gadolinium alloy is expected to provide good structural support for fuel assemblies in canisters for safer storage, transport, and long-term placement in a repository.

For criticality control, engineers and designers prefer a gadolinium alloy internal basket over other neutron-absorbing materials. Initial corrosion tests show that the new nickel-chromium-molybdenum-gadolinium alloy is more corrosion-resistant than the 316L stainless steel alloy used for the fuel storage canister.

Boron, also a neutron absorber, is unacceptable for use in the canister internal structure because weldable structural boron alloys are not available. Also, boron is soluble in water and may flow out of the system, no longer available to absorb neutrons.

Work now is proceeding on alloying gadolinium with a nickel-chrome-molybdenum composition. Initial results indicate acceptable high-temperature processing properties, microstructure, mechanical properties, weldability, and corrosion resistance. A provisional patent application is in place for the alloys and the fabrication process.♣

Fast Flux Test Reactor Fuel Canister



Fabricating the canister internal insert baskets with gadolinium alloy can provide nuclear criticality safety during long-term storage and disposal.

Foreign Reactor Fuel Program Return Totals Since 1996:

- *3243 MTR assemblies*
- *824 TRIGA rods, 267 TRIGA pins*
- *16 shipments*
- *95 casks*

Savannah River 120-Ton Crane Modernization

To further enhance the reliability of SRS Foreign Research Reactor (FRR) cask processing facilities, modernization of the 105-L facility 120-ton crane was completed in December 2000. The L-Stack Area 120-ton crane is used to remove FRR cask subassemblies and to prepare the casks for fuel unloading in the transfer bay area. This crane was built in the 1950s and was originally designed for lifting various reactor components. Mechanical, electrical, and control components of the crane have been modified to obtain maximum reliability and optimum performance for the various offsite research reactor cask receipts and to increase crane reliability. Major mechanical and electrical components of the crane such as the trolley, gearboxes, hooks, motors, and cables have been replaced. Also, the crane bridge, trolley, and hoist control systems were replaced with programmable logic control and variable frequency drive. Ten casks have been handled since the upgrades were completed with no significant problems resulting in processing delays.♣